

**Endoparasitic flea larvae of *Uropsylla tasmanica* (Siphonaptera: Pygiopsyllidae) infest spotted-tailed quolls in southern Queensland.**

The endemic flea, *Uropsylla tasmanica* Rothschild, 1905 is the sole member of the Australian siphonapteran fauna parasitic at the larval stage and the only member globally with obligatory subcutaneous larvae (Dunnet 1970; Pearse 1981). The species exhibits morphological traits conducive to larval endoparasitism and shows remarkable evolutionary convergence with myiasis-causing Dipteran larvae that exploit a similar habitat (Pearse 1981; Williams 1986; 1991). Larval instars of *U. tasmanica* infest carnivorous dasyurid marsupials, consuming subdermal tissue until pupation (Dunnet 1970; Pearse 1981; Obendorf 1993). This short communication provides the first case reports of *U. tasmanica* in Queensland, extending the known geographic range of this highly specialised and often pathogenic flea.

In late autumn/early winter 2017, two wild, adult, male spotted-tailed quolls *Dasyurus maculatus maculatus* (Kerr, 1792) were collected on separate occasions by wildlife carers in the Southern Downs region of Queensland. The first individual (animal 1) was submitted to veterinarians on 29 May 2017 for euthanasia, but the circumstances and location of collection were not ascertained. Two weeks later on 13 June 2017, a second individual (animal 2) became trapped in a chicken coop on a property in Glen Aplin near Mt Tully and submitted to veterinarians. Both quolls underwent health assessments.

Macroscopically, both individuals were in relatively good nutritional condition but presented with extensive red circular skin lesions on the face, body, legs, tail and scrotum (Figure 1). Lesions contained subcutaneous larvae that were extracted by applying digital pressure to the skin. Alopecia (hair loss) and purulent exudate (evidence of secondary infection) were associated with the lesions. Widespread, concurrent mange infestations were observed in both animals (mite species unidentified). Animal 2 also presented with a ruptured right eyeball, a severely ulcerated left eye and suspected damage to the temporomandibular joint as the range of movement was abnormal and crepitus could be felt with slight palpation. Large numbers of larval instars



FIG. 1. *Uropsylla tasmanica* (Rothschild, 1905) infestation on a spotted-tailed quoll, *Dasyurus maculatus maculatus* (Kerr, 1792).

(>150) were extracted from both quolls by squeezing the parasitized areas. Several dozen larvae removed from the scrotal skin of animal 2 were preserved in 70% ethanol and submitted to the Biosecurity Sciences Laboratory for identification. Upon microscopic examination, second and third instar *U. tasmanica* larvae were identified according to the morphological characters outlined by Pearse (1981). A subsample of voucher specimens was deposited at the Queensland Museum, South Brisbane (reference T239667).

To date, host-parasite associations between *U. tasmanica* and dasyurids from the endemic genera *Dasyurus* (quolls), *Parameles* (bandicoots), *Sarcophilus* (Tasmanian devils) *Thylacinus* (Tasmanian tiger) and the exotic *Felis* (domestic cat) have been documented in Tasmania, Victoria, New South Wales and Western Australia (Dunnet & Mardon 1974; Vilcins *et al.* 2008). To our knowledge, the cases presented here constitute the first reports of *U. tasmanica* in Queensland and extend the known geographic range of this species to the Southern Downs region. These data also represent the most northerly occurrences in Australia to date, several hundred kilometres north of previous reports from the New England Tablelands in NSW (Vilcins *et al.* 2008).

The distribution of *U. tasmanica* in Queensland may correlate with that of its host(s). The spotted-tailed quoll (or tiger quoll) occupies a broad range of habitats in south-east Queensland from the New South Wales border to Gladstone, although populations of this vulnerable subspecies are becoming increasingly fragmented (Meyer-Gleaves 2008; Department of the Environment and Energy 2017). Whether the host range of *U. tasmanica* in Queensland encompasses other dasyurids such as the geographically isolated north-eastern quoll subspecies, *D. maculatus gracilis* Ramsay is not currently known. Additional data would be valuable given the pathogenic potential of the flea and its association with the decline of host populations as documented historically (Pearse 1981; Peacock & Abbot 2014).

The clinical significance of parasitism in these quolls was not fully determined. Larvae from animal 1 were manually removed followed by prolonged anti-helminthic and antibiotic treatment, subsequent rehabilitation and release. Animal 2 was euthanised due to extensive facial trauma and overall poor prognosis unrelated to parasitism. While our gross observations are consistent with previous case reports of *U. tasmanica* infestation (Pearse 1981; Obendorf 1993; Vilcins *et al.* 2008), host immunological and histopathological responses to the flea larvae were not examined (see Vilcins *et al.* 2008; Ladds 2009). Additionally, we were unable to assess the behaviour and health of the animals in the field. In the absence of veterinary intervention, however, parasitism by the larval stages of *U. tasmanica* may have imposed a physical handicap on these quolls. Previous studies have reported partial paralysis, severe disability and death among heavily infested hosts (Pearse 1981; Obendorf 1993). The longer term fitness costs associated with persistent infestation (e.g. mobility, foraging ability, sexual selection) are not currently known. Further studies are required to clarify this point.

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